



US 20150036046A1

(19) **United States**(12) **Patent Application Publication**  
**Rudmann et al.**(10) **Pub. No.: US 2015/0036046 A1**(43) **Pub. Date: Feb. 5, 2015**(54) **OPTOELECTRONIC MODULES THAT HAVE SHIELDING TO REDUCE LIGHT LEAKAGE OR STRAY LIGHT, AND FABRICATION METHODS FOR SUCH MODULES****Publication Classification**(51) **Int. Cl.***H04N 5/225* (2006.01)*H01L 25/00* (2006.01)(52) **U.S. Cl.**CPC ..... *H04N 5/2252* (2013.01); *H01L 25/50* (2013.01)USPC ..... **348/374**; 29/25.01(71) Applicant: **Heptagon Micro Optics Pte. Ltd.**,  
Singapore (SG)(72) Inventors: **Hartmut Rudmann**, Jona (CH); **Simon Gubser**, Adliswil (CH); **Susanne Westenhöfer**, Wettswil (CH); **Stephan Heimgartner**, Aarau Rohr (CH); **Jens Geiger**, Thalwil (CH); **Xu Yi**, Singapore (SG); **Thng Chong Kim**, Singapore (SG); **John A. Vidallon**, Singapore (SG); **Ji Wang**, Singapore (SG); **Qi Chuan Yu**, Singapore (SG); **Kam Wah Leong**, Singapore (SG)(21) Appl. No.: **14/339,623**(22) Filed: **Jul. 24, 2014****Related U.S. Application Data**

(60) Provisional application No. 61/859,820, filed on Jul. 30, 2013.

(57)

**ABSTRACT**

Optoelectronic modules include an optoelectronic device and a transparent cover. A non-transparent material is provided on the sidewalls of the transparent cover, which can help reduce light leakage from the sides of the transparent cover or can help reduce stray light from entering the module. The modules can be fabricated, for example, in wafer-level processes. In some implementations, openings such as trenches are formed in a transparent wafer. The trenches then can be filled with a non-transparent material using, for example, a vacuum injection tool. When a wafer-stack including the trench-filled transparent wafer subsequently is separated into individual modules, the result is that each module can include a transparent cover having sidewalls that are covered by the non-transparent material.

